

CLAIMS

What is claimed is:

1. A correction system comprising:
a power detector that provides an indication of power associated with a transmitter output signal; and
a compensation system that employs the indication of power to compensate for at least one transmitter impairment affecting the transmitter output signal.
2. The system of claim 1, the compensation system being configured to selectively adjust at least one of an in-phase (I) signal component and a quadrature (Q) signal component based on the indication of power to mitigate distortion characteristics in the transmitter output signal.
3. The system of claim 2, the indication of power further comprising a relative power measured by the power detector associated with the respective I and Q signal components.
4. The system of claim 1, the compensation system further comprising a carrier correction system that adjusts DC offset of at least one of an in-phase (I) signal component and a quadrature (Q) signal component utilized to provide the transmitter output signal based on the indication of power to mitigate spikes in the carrier level of the transmitter output signal.
5. The system of claim 1, the compensation system further comprising an equalization system that adjusts tones in a signal spectrum employed to provide the transmitter output signal so that the signal spectrum has a desired spectral shape, the equalization system adjusting the tones in the signal spectrum during calibration based on the indication of power.

6. The system of claim 5, the equalization system selectively weighting tones in the signal spectrum based on an indication of power associated with the tones in the signal spectrum relative to an indication of power associated with a reference tone in the signal spectrum.

7. The system of claim 6, further comprising:

a comparator that compares a power characteristic associated with each of the tones in the signal spectrum relative to a power characteristic of the reference tone to provide an indication of relative power for each respective tone; and

a weighting function that employs the indication of relative power for each respective tone to adjust each respective tone to a desired level relative to the reference tone.

8. The system of claim 7, the weighting function being applied to adjust at least one of the I-signal component and the Q-signal component of the transmitter output signal to provide the desired spectral shape.

9. The system of claim 1, further comprising a detector bias component configured to determine a DC bias associated with operation of the power detector, the compensation system employing the DC bias to mitigate effects of the DC bias in the indication of power.

10. The system of claim 1, the compensation system is operative to adjust at least one of an in-phase (I) signal component and a quadrature (Q) signal component based on the indication of power to compensate for at least one of a gain and phase mismatch between a signal path for the I-signal component and a signal path for the Q-signal component.

11. The system of claim 1, further comprising a mismatch correction system operative to ascertain an indication of at least one of a gain and phase mismatch between an in-phase (I) signal component and a quadrature (Q) signal component based on the indication of power, the mismatch correction system adjusting at least one of the I-signal component and the Q-signal component based on the indication of the mismatch between I and Q signal components.

12. The system of claim 11, the mismatch correction system further comprising:
a comparator that compares the indication of power associated with the I-signal component and the indication of power associated with Q-signal component to provide an indication of relative power characteristics corresponding to the mismatch associated with a signal path for the I-signal component and a signal path for the Q-signal component; and
a control operative to adjust at least one of the I and Q signal components based on the indication of the relative power characteristics.

13. An integrated circuit comprising the system of claim 1.

14. A communications apparatus comprising:
a baseband system that provides in-phase (I) and quadrature (Q) signal components;
a correction system associated with the baseband system for adjusting at least one of the I and Q signal components based on an indication of power of a transmit signal to compensate for impairments associated with the communications apparatus;
a transmitter that provides the transmit signal based on the adjusted I and Q signal components; and
a power detector that detects power associated with the transmit signal and provides the indication of power.

15. The apparatus of claim 14, the correction system further comprising a carrier correction system that adjusts a level of at least one of the I and Q signal components based on the indication of power to compensate for an impairment associated with the communications apparatus that affects a level of the carrier signal in the transmit signal.

16. The apparatus of claim 15, the correction system further comprising an equalization system that adjusts tones in a signal spectrum corresponding to the transmit signal based on the indication of power so that the signal spectrum has a desired spectral shape.

17. The apparatus of claim 16, the equalization system selectively weighting tones in the signal spectrum based on an indication of power associated with the tones in the signal spectrum relative to the indication of power associated with a reference tone in the signal spectrum.

18. The apparatus of claim 16, the correction system further comprising a mismatch correction system operative to ascertain, based on the indication of power, an indication of mismatch associated with a signal path for the I-signal component and a signal path for the Q-signal component, the mismatch correction system adjusting at least one of the I-signal component and the Q-signal component based on the indication of the mismatch between I and Q signal components.

19. The apparatus of claim 18, wherein the mismatch further comprises at least one of a phase imbalance and a gain mismatch caused by circuitry in the signal path for the I-signal component and the signal path for the Q-signal component.

20. An integrated circuit comprising the system of claim 14.

21. A transmitter system comprising:
means for determining an indication of power associated with a transmit output signal; and
means for compensating for distortion in the transmit output signal based on the indication of power.
22. The system of claim 21, further comprising means for shaping a signal spectrum in the transmit output signal by adjusting at least one of an in-phase (I) signal component and a quadrature (Q) signal component based on the indication of power.
23. The system of claim 21, further comprising means for, based on the indication of power, compensating for at least one of gain and phase mismatch associated with an in-phase signal path and a quadrature signal path of the transmitter system.
24. The system of claim 21, further comprising means for mitigating spikes in a carrier signal of the transmit signal by applying a DC signal to, based on the indication of power, adjust at least one of an in-phase (I) signal component and a quadrature (Q) signal component.
25. The system of claim 21, wherein the impairments comprise at least one of spikes in a carrier signal of the transmit signal, attenuation distortion in a signal spectrum corresponding to at least a portion of the transmit signal, a gain mismatch associated with an in-phase (I) signal path and a quadrature (Q) signal path, and a phase mismatch associated with the I-signal path and the Q-signal path.
26. The system of claim 25, further comprising means for calibrating the means for compensating to mitigate the impairments.

27. The system of claim 26, the means for calibrating further comprising:

means for providing at least one calibration tone having an I-signal component and a Q-signal component; and

means for adjusting at least one of the I-signal component and the Q-signal component based on the indication power, the means for compensating employing the adjusted at least one of the I-signal component and the Q-signal component to mitigate the impairments.

28. A method to correct impairments associated with a communications apparatus, the method comprising:

detecting an indication of power associated with a transmit signal; and

selectively adjusting at least one of an in-phase (I) signal component and a quadrature (Q) signal component based on the indication of power to compensate for impairments associated with the communications apparatus that affect the transmit signal.

29. The method of claim 28, further comprising applying a DC offset for at least one of the I-signal component and the Q-signal component to mitigate spikes in a carrier for the transmit signal.

30. The method of claim 28, further comprising adjusting at least one of the I-signal component and the Q-signal component based on the indication of power to mitigate at least one of gain and phase mismatches associated with an I-signal path and a Q-signal path to which the respective I-signal component and the Q signal component are provided.

31. The method of claim 30, further comprising:
- determining an indication of a phase imbalance associated with the I-signal path and the Q-signal path;
 - determining an indication of a gain mismatch associated with the I-signal path and the Q-signal path; and
 - calibrating the adjustments to the at least one of the I-signal component and the Q-signal component based on the indication of the phase imbalance and the indication of the gain mismatch.
32. The method of claim 28, further comprising applying weight factors to at least one of the I-signal component and the Q-signal component for tones that form a signal spectrum of the transmit signal for adjusting a spectral shape of the transmit signal.
33. The method of claim 32, further comprising determining a weight factor for each of the tones based on an indication of power associated with each respective one of the tones relative to an indication of power associated with a reference one of the tones.